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(54) **CLAMP APPARATUS**

(56) **References Cited**

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U.S. PATENT DOCUMENTS

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4,905,973 A 3/1990 Blatt
5,967,502 A * 10/1999 Dykstra B25B 5/122
269/228
6,279,886 B1 8/2001 Grossart

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(Continued)

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CN 1325781 A 12/2001
DE 10057345 A1 5/2001

(Continued)

FOREIGN PATENT DOCUMENTS

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OTHER PUBLICATIONS

Combined Office Action and Search Report issued on Jul. 21, 2015 in Chinese Patent Application No. 201380036755.0 with English translation.

(Continued)

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(57) **ABSTRACT**

A clamp apparatus is equipped with a body, and a drive unit having a piston displaced under the supply of a pressure fluid. A clamp arm is disposed rotatably on the body. In addition, a piston rod of the drive unit is connected detachably with respect to a displaceable body of a driving force transmission mechanism which is disposed in the interior of the body. Upon detachment of a connector of the piston rod from a connecting recess of the displaceable body, the state of connection between the drive unit and the driving force transmission mechanism is released.

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(58) **Field of Classification Search**

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See application file for complete search history.

10 Claims, 10 Drawing Sheets

